

Audit Report



HAZADOUS MATERIAL MANAGEMENT FOR MAJOR DEFENSE SYSTEMS

Report No. D-2000-121

May 4, 2000

Office of the Inspector General
Department of Defense

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Acronyms

CHRIMP	Consolidated Hazardous Material Reutilization and Inventory Management Program
GOLD	Government-on-Line-Data
HSMS	Hazardous Substance Management System
NAS	Naval Air Station
NEPA	National Environmental Policy Act of 1969
PESHE	Programmatic Environmental, Safety, and Health Evaluation
SFFAS	Statement of Federal Financial Accounting Standards



INSPECTOR GENERAL
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May 4, 2000

MEMORANDUM FOR UNDER SECRETARY OF DEFENSE FOR ACQUISITION,
TECHNOLOGY, AND LOGISTICS
UNDER SECRETARY OF DEFENSE (COMPTROLLER)
ASSISTANT SECRETARY OF THE AIR FORCE
(FINANCIAL MANAGEMENT AND COMPTROLLER)
DIRECTOR, DEFENSE LOGISTICS AGENCY
NAVAL INSPECTOR GENERAL
AUDITOR GENERAL, DEPARTMENT OF THE ARMY

SUBJECT: Audit Report on the Hazardous Material Management for Major Defense
Systems (Report No. D-2000-121)

We are providing this audit report for your information and use. The Joint Logistics Commanders requested an audit of hazardous material management for major Defense systems. This report is the seventh and final report in a series of reports resulting from the requested audit and summarizes our overall evaluation. Because this report contains no adverse findings or recommendations, no written comments were required, and none were received.

We appreciate the courtesies extended to the audit staff. For additional information on this report, please contact Mr. John E. Meling at (703) 604-9091 (DSN 664-9091) (jmeling@dodig.osd.mil) or Mr. Jack D. Snider at (703) 604-9087 (DSN 664-9087) (jsnider@dodig.osd.mil). See Appendix G for the report distribution. The audit team members are listed inside the back cover.

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Report No. D-2000-121

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(Project No. D1998AE-0012.005)

(Formerly Project No. 8AE-5037.06)

Hazardous Material Management for Major Defense Systems

Executive Summary

Introduction. This report is the seventh and final report in a series dealing with our audit of hazardous material management for major Defense systems and summarizes our overall evaluation of the audit. The first six reports addressed hazardous material management for the Army Black Hawk Helicopter and Grizzly Programs, the Navy *Nimitz*-Class Nuclear Aircraft Carrier Program and T-45 Undergraduate Jet Pilot Training System, and the Air Force C/KC-135 Stratotanker Aircraft and F-15 Aircraft Programs. This report also includes the hazardous material management results from our program management reviews of the Army RAH-66 Comanche Helicopter Program and the Air Force *Minuteman III* Guidance and Propulsion Replacement Programs.

Objectives. The Joint Logistics Commanders requested an audit of hazardous material management for major Defense systems. The overall audit objective was to evaluate the adequacy of planning and providing for the reduction and control of hazardous materials used in the design, manufacture, maintenance, and disposal of major Defense systems. Specifically, we evaluated whether program managers managed the selection, use, and disposal of hazardous materials so that DoD incurs the lowest cost possible that is consistent with the system's cost, schedule, and performance goals while protecting human health and the environment over the system's life cycle. We also evaluated the management control program as it related to the audit objective.

Results. Overall, the program offices for the nine programs reviewed generally planned and provided for the reduction and elimination of hazardous material in their programs. However, the program offices needed to improve environmental management in one or more of the following areas:

- developing a programmatic environmental, safety, and health evaluation;
- estimating the environmental costs for demilitarization, disposal, and cleanup of the system;
- processing an analysis of the potential environmental consequences of developing and deploying the system; and
- establishing a hazardous material reutilization and inventory management program.

Because of the needed improvements in environmental management, the program offices experienced one or more of the following effects:

- cannot ensure that they are fully addressing environmental, safety, and health issues on mission and cost;

-
- may be foregoing opportunities to reduce environmental life-cycle costs;
 - understated the total life-cycle costs for the program and unable to accurately report the liability for demilitarization, disposal, and environmental cleanup costs for the program in FY 2000 financial statements; and
 - may not be able to determine the effects of the program on the environment.

Generally, the hazardous material management policy was adequate in that the conditions noted were not policy related but instead the result of program offices not fully implementing the policy. For the most part, the program offices took, or are taking, corrective action in response to the recommendations in our earlier reports. See the Audit Results section for a discussion of our overall evaluation. Details on the results of the management control program are in Appendix A.

Management Comments. We provided a draft of this report on March 31, 2000. Because the draft report contains no adverse findings or recommendations, written comments were not required, and none were received. Therefore, we are publishing this report in final form.

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Background

DoD Environmental Management Policy. DoD environmental management policy relating to hazardous materials is to prevent, mitigate, or remediate environmental damage that acquisition programs cause. In designing, manufacturing, testing, operating, and disposing of systems, DoD program managers are to prevent or reduce all forms of pollution at the source, whenever feasible. Prudent investments in pollution prevention can reduce life-cycle environmental costs and liability and improve environmental quality and program performance. Further, the Secretary of Defense, in his 1998 annual report to the President and Congress, stated that DoD urgently needed to reduce the total ownership costs of its systems to sustain force modernization and recapitalization. To reduce total ownership costs, program managers need to focus on total life-cycle costs in the development and production phases of the weapon system acquisition life cycle so that trade-offs can be made between investments in the development and production phases and reduced costs in the operation and support phase. Appendix C provides definitions of technical terms used in this report.

Programs Reviewed. This report is the seventh and final report in a series on our audit of hazardous material management for major Defense systems and summarizes our overall evaluation of the audit. The first six reports addressed hazardous material management for the Army Black Hawk Helicopter (the Black Hawk) and Grizzly (the Grizzly) Programs, the Navy *Nimitz*-Class Nuclear Aircraft Carrier Program (the *Nimitz*-Class) and T-45 Undergraduate Jet Pilot Training System (the T-45), and the Air Force C/KC-135 Stratotanker Aircraft (the C/KC-135) and F-15 Aircraft (the F-15) Programs. This report also includes the hazardous material management results from our program management reviews of the Army RAH-66 Comanche Helicopter Program (the Comanche), and the Air Force *Minuteman III* Guidance and Propulsion Replacement Programs (the *Minuteman III* Guidance and Propulsion, respectively). Appendix D provides a descriptive information on the Defense systems that we reviewed.

Objectives

The Joint Logistics Commanders requested an audit of hazardous material management for major Defense systems. The overall audit objective was to evaluate the adequacy of planning and providing for the reduction and control of hazardous materials used in the design, manufacture, maintenance, and disposal of major Defense systems. Specifically, we evaluated whether program managers managed the selection, use, and disposal of hazardous materials so that DoD incurs the lowest cost possible that is consistent with the system's cost, schedule, and performance goals while protecting human health and the environment over the system's life cycle. We also evaluated the management control program as it related to the audit objective. Appendix A discusses the scope and methodology used to accomplish the objective and Appendix B contains a summary of prior coverage related to the audit objective.

Environmental Management

Overall, the program offices for the nine programs reviewed generally planned and provided for the reduction and elimination of hazardous material in their programs. However, the program offices experienced system-specific environmental management shortcomings in one or more of the following areas:

- developing a programmatic environmental, safety, and health evaluation (PESHE) that included a strategy for meeting environmental, safety, and health requirements; that identified demilitarization and disposal requirements and program environmental responsibilities; and that established a methodology to track progress throughout the acquisition life-cycle;
- estimating the environmental costs for demilitarization, disposal, and cleanup of the system at the end of its useful life in the life-cycle cost estimate;
- processing an analysis of the potential environmental consequences of developing and deploying the system; and
- establishing a hazardous material reutilization and inventory management program with software that controls, tracks, and reduces the variety and use of hazardous material.

Because of the needed improvements in environmental management, the program offices experienced one or more of the following effects:

- cannot ensure awareness of the impact of environmental, safety, and health issues on mission and cost;
- may be foregoing opportunities to further reduce environmental life-cycle costs over the life span of the program;
- understated the total life-cycle costs for the program and unable to accurately report the liability for demilitarization, disposal, and environmental cleanup costs for the program in FY 2000 financial statements; and
- may not be able to determine the effects of the program on the environment.

Environmental and Life-Cycle Cost Estimating and Reporting Guidance

DoD Environmental Guidance. DoD Regulation 5000.2-R, "Mandatory Procedures for Major Defense Acquisition Programs (MDAPS) and Major Automated Information System (MAIS) Acquisition Programs," Change 4, May 11, 1999,¹ provides guidance on environmental, safety, and health evaluations and environmental analyses.

Environmental, Safety, and Health Evaluation Guidance. DoD Regulation 5000.2-R requires that all programs, regardless of acquisition category, conduct environmental, safety, and health analyses to integrate environmental, safety, and health issues into the system engineering process. The analyses must support the development of a PESHE that the program office includes in the acquisition strategy. The program manager must initiate the PESHE at the earliest possible time, usually in support of a program initiation decision (Milestone I), and must update the evaluation throughout the life cycle of the program. Acquisition managers use the PESHE to:

- describe the program manager's strategy for meeting environmental, safety, and health requirements;
- establish program responsibilities; and
- identify how a program manager will track progress.

Environmental Analysis Guidance. DoD Regulation 5000.2-R implements the requirements of the National Environmental Policy Act of 1969 (NEPA). NEPA requires all Federal agencies that fund projects to analyze and make decisions in full consideration of the impact of those projects to the natural and human environments. Federal agencies may make the analysis in the form of an environmental assessment or a more stringent environmental impact statement. NEPA also allows Federal agencies to develop and apply categorical exclusions to exempt proposed actions from the required analysis.

DoD Life-Cycle Cost Estimating and Reporting Guidance. DoD Regulation 5000.2-R; DoD Regulation 7000.14-R, "DoD Financial Management Regulation," Volume 4, August 1999; DoD Manual 5000.4-M, "Department of Defense Cost Analysis Guidance and Procedures," December 1992; and the Defense Acquisition Deskbook provide life-cycle cost estimating and reporting guidance, including the reporting of environmental and disposal liabilities.

¹DoD initially issued DoD Regulation 5000.2-R on March 15, 1996. It included requirements concerning environmental, safety, and health evaluations; environmental analyses; and comprehensive life-cycle cost estimates.

DoD Regulation 5000.2-R. DoD Regulation 5000.2-R requires that life-cycle cost estimates be comprehensive and identify all costs for the development, production, and operation of a system regardless of the source of funding.

DoD Regulation 7000.14-R. DoD Regulation 7000.14-R prescribes the accounting policy and principles for estimating and reporting in DoD financial statements the liabilities associated with the disposition of property, structures, equipment, munitions, and weapons, and the liabilities associated with the containment, treatment, or removal of contamination that could pose a threat to public health and the environment. Further, the Regulation states that liability recognition will not be based on the availability of funds.

DoD Manual 5000.4-M. DoD Manual 5000.4-M requires that program offices identify the cost of any hazardous, toxic, or radiological materials that may be encountered or generated during system development, manufacture, transportation, storage, operation, and disposal. Furthermore, the guidance states that program offices should include the costs of demilitarization, detoxification, or long-term waste storage in the cost estimates.

Defense Acquisition Deskbook. The Defense Acquisition Deskbook states that life-cycle cost estimates should:

- cover the entire planned life of a program and include all cost categories (concept exploration, if applicable; demonstration and validation; engineering and manufacturing development; production and deployment; operations and support; and demilitarization and disposal) and all appropriation accounts; and
- address environmental costs (examples of such costs include pollution prevention, hazardous waste management, demilitarization and disposal of equipment, and cleanup of real estate).

Federal Financial Accounting Standards Guidance. The Statement of Federal Financial Accounting Standards (SFFAS) No. 6, "Accounting for Property Plant, and Equipment," requires that Federal agencies, beginning in FY 1998, recognize a liability in agency financial statements for cleanup costs associated with Federal property, plant, and equipment, including weapon systems, when the agency places the property, plant, and equipment into service. SFFAS No. 6 defines cleanup costs as those costs to remove, contain, or dispose, or any combination of the three, of hazardous waste from material or property that is permanently or temporarily shut down. In addition, cleanup costs include decontaminating, decommissioning, site restoring, site monitoring, and closure and post-closure costs.

Improvements Needed

The program offices for the nine programs reviewed needed to improve their environmental management in the areas of developing a PESHE, estimating environmental costs, processing an environmental analysis, and establishing a hazardous material management program. The following table summarizes the system-specific areas that required improvement for the nine systems reviewed.

**Summary of Improvements Needed for the
Nine Defense Systems Reviewed**

Systems Reviewed by Military Component	Areas That Required Improvement			
	Developing a PESHE	Estimating Environmental Costs	Processing an Environmental Analysis	Establishing a Hazardous Material Management Program
<u>Army</u>				
Black Hawk	X	X		
Grizzly	X	X		
Comanche		X		
<u>Navy</u>				
Nimitz-Class	X	X		
T-45		X		X
<u>Air Force</u>				
C/KC-135	X	X		
F-15	X	X		
Minuteman III Guidance	X			
Minuteman III Propulsion	X		X	

Each program office took, or plans to take, appropriate corrective action in response to recommendations made in individual system audit reports. The results of our review of the nine systems, including applicable findings, recommendations, and management comments, are summarized in Appendix E. The following discusses the system-specific areas that required improvement for the nine systems reviewed.

Developing a PESHE. Seven of the nine program offices did not fully develop a PESHE that included an environmental strategy, program environmental responsibilities, and a methodology for tracking and documenting the completion of the environmental strategy throughout the acquisition life cycle of the system. This condition occurred because one or more of the program offices:

-
- believed that the March 1996 requirement established in DoD Regulation 5000.2-R applied only to new acquisition programs that began after March 1996 (*Nimitz*-Class, *Minuteman III* Guidance, and *Minuteman III* Propulsion);
 - incurred administrative delays or needed technical assistance in developing and completing the PESHE (Grizzly and F-15);
 - believed that its response to an environmental compliance review complied with PESHE requirements (Black Hawk);
 - relied on a weapon system pollution prevention master plan to address the environmental requirements of the program (C/KC-135); and
 - did not update the PESHE throughout the system's life cycle to incorporate upgrades to the system (F-15).

As a result, the program offices cannot ensure that they are aware of the impact of environmental, safety, and health issues on mission and cost and may be forgoing opportunities to further reduce environmental life-cycle costs over the life span of the systems.

Estimating Environmental Costs. Seven of the nine program offices did not include the environmental costs for demilitarization, disposal, and associated cleanup of the respective systems at the end of their useful lives in the system life-cycle cost estimates. This condition occurred because one or more of the program offices:

- did not have historical cost data, cost models, or the technical expertise to estimate those costs (Grizzly, Comanche, *Nimitz*-Class, T-45, F-15, and C/KC-135);
- believed that those environmental costs were not significant enough to estimate because the program office anticipated donating and selling the system components instead of disposing of them (Black Hawk);
- believed that the system's production design would reduce or eliminate many of the hazardous materials used in the design (Comanche); and
- believed that the March 1996 requirement established in DoD Regulation 5000.2-R applied only to new acquisition programs that began after March 1996 (*Nimitz*-Class).

As a result, the respective project offices understated the total life-cycle costs for their programs and would not have been able to accurately report the liability for demilitarization, disposal, and environmental cleanup costs for their systems in applicable financial statements beginning in FY 2000.

Processing an Environmental Analyses. The System Program Office for the *Minuteman III* Propulsion Replacement Program did not ensure that analyses of the potential environmental consequences of developing and deploying the Program were processed as required. This condition occurred because the System Program Office did not consider the increase in program activity to be significant and it was not familiar with Air Force guidance recommending against granting categorical exclusions for acquisition programs or DoD guidance requiring the milestone decision authority to approve environmental analyses documentation. As a result, the System Program Office may not be aware of the environmental effects of the program and may not be able to inform the Air Force Acquisition Executive of those effects at the full-rate production decision review scheduled for September 2000.

Establishing a Hazardous Material Management Program. The Naval Air Station (NAS) Kingsville, Texas, a maintenance facility for the T-45TS aircraft, did not establish a Consolidated Hazardous Material Reutilization and Inventory Management Program (CHRIMP) with Hazardous Substance Management System (HSMS) software that controls, tracks, and reduces the variety and use of hazardous material. Also, NAS Kingsville did not have a hazardous material minimization center (the Center) that provided centralized storage, distribution, and reuse of hazardous material and the disposal of hazardous material waste. Further, the T-45TS Program Office contracted for a hazardous material module to its Government-on-Line-Data (GOLD) System to measure hazardous material use against a given work item; however, the module does not provide a life-cycle approach for managing hazardous material as does HSMS. NAS Kingsville did not establish a CHRIMP with HSMS software and a fully operational Center because supply personnel believed that their existing implementation of the CHRIMP met Navy requirements. The Program Office advised that it contracted for the GOLD System's hazardous material module because it considered the module to be a streamlining effort to make material tracking an integral part of the T-45TS maintenance process. As a result, NAS Kingsville did not achieve life-cycle hazardous material control, management, and pollution prevention for the T-45TS in conformance with Navy policy.

DoD Hazardous Material Management Policy Adequate

Although we identified systemic conditions in program offices preparing the PESHE and comprehensive life-cycle cost estimates, the DoD hazardous material management policy for the programs reviewed was adequate. The conditions noted were not policy related but instead the result of program offices not fully implementing the policy. Management controls were in place to ensure that the program offices prepared a PESHE and a comprehensive life-cycle cost estimate. Specifically, the program offices are to submit the documentation to milestone decision authorities for review during the milestone review process and are to report environmental liability for their systems in applicable financial statements, starting in FY 2000. However, we only observed the functioning of the management controls for the Grizzly in support of milestone decision because the other programs included in our review had not undergone a milestone decision review since March 1996 and the DoD guidance for reporting environmental liability was being finalized at the time of our program

reviews. As discussed in our report on the Grizzly, management was aware of the need for a PESHE at the time of the milestone decision in December 1996 and began working to develop a PESHE. In response to the recommendations in our earlier reports, the program offices took, or are taking, corrective action to fully implement DoD hazardous material management policy. Further, when the program offices report the liability for demilitarization, disposal, and environmental cleanup costs in applicable financial statements, they will need to review and update their comprehensive life-cycle cost estimates and PESHE environmental strategies and associated program environmental responsibilities. Accordingly, we are not making recommendations in this report to correct the systemic conditions.

Conclusion

Overall, the program offices for the nine programs reviewed generally planned and provided for the reduction and elimination of hazardous material in their programs. We commend the nine program offices for their responsiveness to system-specific recommendations made to improve environmental and life-cycle cost management. Their actions should help to prevent, mitigate, or remediate environmental damage that acquisition programs cause and should reduce life-cycle environmental costs and liability and improve environmental quality and program performance.

Appendix A. Audit Process

Scope and Methodology

We conducted this audit from November 1998 through March 2000 and reviewed documentation dated from June 1976 through March 2000 relating to the nine programs reviewed: the Army Black Hawk Helicopter, Grizzly, and RAH-66 Comanche Helicopter Programs; the Navy *Nimitz*-Class Nuclear Aircraft Carrier Program and T-45 Undergraduate Jet Pilot Training System; and the Air Force C/KC-135 Stratotanker Aircraft, F-15 Aircraft, and *Minuteman III* Guidance and Propulsion Replacement Programs. To accomplish the audit objective, we took the following steps:

- discussed the issues relating to DoD environmental management and the associated acquisition strategy with Government and contractor personnel,
- assessed whether the programs reviewed implemented the DoD environmental management process in accordance with DoD Regulation 5000.2-R,
- reviewed life-cycle costs of the programs reviewed to determine whether program offices included environmental costs,
- issued a separate report for each program reviewed and summarized those reports in Appendix E, and
- used the results of those reports for each program reviewed to summarize our evaluation of the adequacy of the hazardous material management for major Defense systems.

Auditing Standards. We conducted this program audit in accordance with auditing standards issued by the Comptroller General of the United States, as implemented by the Inspector General, DoD. We included such tests of management controls, as we deemed necessary.

Use of Computer-Processed Data. We relied on computer-processed data to develop conclusions on this audit as addressed in Inspector General, DoD, Report No. 98-185, "Financial Management of the RAH-66 Comanche Helicopter Program," August 6, 1998.

Use of Technical Assistance. Technical experts for the Technical Assessment Division of the Audit Followup and Technical Support Directorate, Inspector General, DoD, assisted in the audit. We addressed the technical assistance that the experts provided in Inspector General, DoD, Report No. 97-199, "The *Minuteman III* Guidance Replacement Program," July 29, 1997.

Contacts During the Audit. We visited or contacted individuals and organizations within DoD and contractor locations. Further details are available on request.

DoD-Wide Corporate-Level Government Performance and Results Act Goals. In response to the Government Performance and Results Act, the Secretary of Defense annually establishes DoD-wide corporate level goals, subordinate performance goals, and performance measures. This report pertains to achievement of the following corporate level goal, subordinate performance goal, and performance measure.

- **FY 2000 DoD Corporate Level Goal 2:** Prepare now for an uncertain future by pursuing a focused modernization effort that maintains U.S. qualitative superiority in key warfighting capabilities. Transform the force by exploiting the Revolution in Military Affairs, and reengineer the Department to achieve a 21st century infrastructure. (00-DoD-2)
- **FY 2000 Subordinate Performance Goal 2.4:** Meet combat forces' needs smarter and faster, with products and services that work better and cost less, by improving the efficiency of DoD's acquisition processes. (00-DoD-2.4)
- **FY 2000 Performance Measure 2.4.1:** Major Defense Acquisition Program Cost Growth (keep growth below a 1 percent increase annually). (00-DoD-2.4.1)

DoD Functional Area Reform Goals. Most major DoD functional areas have also established performance improvement reform objectives and goals. This report pertains to achievement of the following acquisition functional issue area objective and goal.

Objective: Fostering Partnerships. **Goal:** Reduce total release of toxic chemicals by 20 percent. (ACQ-2.4)

General Accounting Office High-Risk Area. The General Accounting Office has identified several high-risk areas in DoD. This report provides coverage of the Defense Weapons Systems Acquisition high-risk area.

Management Control Program Review

Requirement for Management Control Reviews. DoD Directive 5010.38, "Management Control (MC) Program," August 26, 1996, requires DoD managers to implement a comprehensive system of management controls that provides reasonable assurance that programs are operating as intended and to evaluate the adequacy of the controls.

Scope of Review of the Management Control Program. In accordance with DoD Directive 5000.1, "Defense Acquisition," March 15, 1996, and DoD Regulation 5000.2-R, acquisition managers are to use program cost, schedule,

and performance parameters as control objectives to implement the requirements of DoD Directive 5010.38. Accordingly, we limited our review to management controls directly related to the hazardous material management of the Army Black Hawk Helicopter, Grizzly, and RAH-66 Comanche Helicopter Programs; the Navy *Nimitz*-Class Nuclear Aircraft Carrier Program and T-45 Undergraduate Jet Pilot Training System; and the Air Force C/KC-135 Stratotanker Aircraft, F-15 Aircraft, and *Minuteman III* Guidance and Propulsion Replacement Programs.

Adequacy of Management Controls. We identified material management control weaknesses, as defined by DoD Instruction 5010.40, "Management Control (MC) Program Procedures," August 28, 1996, applicable to the audit objective. We addressed those weaknesses in Inspector General, DoD, Report No. D-2000-092, "Acquisition of the *Minuteman III* Propulsion Replacement Program," March 1, 2000; Inspector General, DoD, Report No. 99-160, "Hazardous Material Management on the Grizzly Program," May 17, 1999; and Inspector General, DoD, Report No. 98-185, "Financial Management of the RAH-66 Comanche Helicopter Program," August 6, 1998.

Appendix B. Summary of Prior Coverage

During the last 5 years, the General Accounting Office; the Inspector General, DoD; the Army Audit Agency; and the Air Force Inspection Agency have issued 15 reports that address environmental issues. Appendix E summarizes 9 of the 10 following Office of the Inspector General, DoD, reports that discuss the Defense systems reviewed and addressed in this report. Appendix F provides a summary of the Army Audit Agency report listed below because the report addresses an area of concern similar to that discussed in this report: the need to improve the identification of environmental life-cycle costs.

General Accounting Office

Report No. AIMD-98-32 (OSD Case No. 1491), "Financial Management: DoD's Liability for the Disposal of Conventional Ammunition Can Be Estimated," December 19, 1997.

Report No. AIMD-98-9 (OSD Case No. 1476), "Financial Management: DoD's Liability for Aircraft Disposal Can Be Estimated," November 20, 1997.

Report No. AIMD-97-135R (OSD Case No. 1408), "Financial Management: Factors to Consider in Estimating Environmental Liabilities for Removing Hazardous Materials in Nuclear Submarines and Ships," August 7, 1997.

Inspector General, DoD

Report No. D-2000-092, "Acquisition of the *Minuteman III* Propulsion Replacement Program," March 1, 2000.

Report No. 00-022, "Hazardous Material Management for the *Nimitz*-Class Nuclear Aircraft Carrier Program," October 27, 1999.

Report No. 00-012, "Hazardous Material Management for the F-15 Aircraft Program," October 15, 1999.

Report No. 99-242, "Hazardous Material Management for the Black Hawk Helicopter Program," August 23, 1999.

Report No. 99-221, "Hazardous Material Management for the T-45 Undergraduate Jet Pilot Training System," July 21, 1999.

Report No. 99-209, "Data Supporting the DoD Environmental Line Item Liability on the FY 1998 Financial Statements," July 9, 1999.

Report No. 99-177, "Hazardous Material Management for the C/KC-135 Stratotanker Aircraft," June 4, 1999.

Inspector General, DoD (Cont'd)

Report No. 99-160, "Hazardous Material Management on the Grizzly Program," May 17, 1999.

Report No. 98-185, "Financial Management of the RAH-66 Comanche Helicopter Program," August 6, 1998.

Report No. 97-199, "The *Minuteman III* Guidance Replacement Program," July 29, 1997.

Army Audit Agency

Report No. AA 98-153, "Eliminating Hazardous Materials in Weapon Systems," April 15, 1998.

Air Force Inspection Agency

Report No. PN 95-703, "Occupational Surveillance Aspects of Pollution Prevention Programs in Air Force Acquisition," March 22, 1996.

Appendix C. Definitions of Technical Terms

Acquisition Category. An acquisition category is an attribute of an acquisition program that determines the program's level of review, decision authority, and applicable procedures. The acquisition categories consist of I, major Defense acquisition programs; IA, major automated information systems; II, major systems; and III, all other acquisition programs. Acquisition Category I includes two subcategories: ID for which the milestone decision authority is the Under Secretary of Defense for Acquisition, Technology, and Logistics and IC for which the milestone decision authority is the cognizant DoD Component Head or, if delegated, the Component Acquisition Executive.

Demilitarization. Demilitarization is part of the disposal process and is the act of deactivating or rendering a system inoperable by destroying its inherent military offensive or defensive advantage.

Disposal. Disposal is the process of transferring, donating, selling, abandoning, or destroying a system.

Environmental Assessment. An environmental assessment provides sufficient evidence and analysis to determine whether the preparation of an environmental impact statement or a finding of no significant impact is required for an acquisition program to comply with the National Environmental Policy Act.

Environmental Impact Statement. An environmental impact statement provides a detailed description of the effects or consequences associated with testing, operating, maintaining, and disposing of a weapon or automated information system.

Finding of No Significant Impact. A finding of no significant impact is a document that a Federal agency prepares to briefly present the reasons why an action will not have a significant impact on the human environment and why an environmental impact statement is not necessary. Additionally, the document includes the environmental assessment or summary of the environmental assessment for the acquisition program.

Hazardous Material. Hazardous material is any substance that because of its quantity; toxicity; corrosiveness; flammability; or physical, chemical, or infectious characteristics may:

- cause or significantly contribute to an increase in mortality or an increase in a serious irreversible or incapacitating reversible illness; or
- pose a substantial present or potential hazard to human health or the environment when the waste is improperly treated, stored, transported, or disposed of.

Low-Rate Initial Production. Low-rate initial production is the production of a system in limited quantities to provide articles for additional operational test

and evaluation, to establish an initial production base, and to permit an orderly increase in the production rate that will lead to full-rate production after successful completion of operational testing.

Overhaul. An overhaul is a major ship availability established for general maintenance and alterations at a naval shipyard or other shore-based depot-level repair activity. During this period, the ship generally undergoes the installation of alterations and modifications to update its capabilities and large-scale maintenance that cannot be undertaken at other times.

Programmatic Environmental, Safety, and Health Evaluation. A programmatic environmental, safety, and health evaluation describes the program manager's strategy for meeting programmatic environmental, safety, and health evaluation requirements, establishes responsibilities, and identifies how progress will be tracked. The program manager initiates the programmatic environmental, safety, and health evaluation at the earliest possible time in support of a program initiation decision (usually Milestone I), and updates the evaluation throughout the life cycle of the program.

Ship Alteration. A ship alteration is any change in the hull, machinery, equipment, or fittings, which involves change in design, materials, number, location, or relationship of the component parts of any assembly.

Total Ownership Cost. Total ownership cost is the cost associated with the research, development, procurement, operation, logistical support and disposal of an individual weapon system, including the total supporting infrastructure that plans, manages, and executes the weapon system program over its full life. Total ownership cost also includes the cost of common support items and systems that are incurred because of the introduction of that weapon system. However, total ownership cost does not include infrastructure costs that are not affected by the individual weapon systems' development, introduction, deployment or operations.

Appendix D. Descriptive Information on Selected Defense Systems

The following provides descriptive information on the nine Defense systems that we reviewed and addressed in this report.

C/KC-135 Stratotanker Aircraft. The C/KC-135 Stratotanker Aircraft (the C/KC-135) is an Air Force program consisting of Acquisition Category II and III modification programs.² The principal mission of the C/KC-135 aircraft is aerial refueling of other aircraft. The Air Force acquired 808 stratotankers and other variants³ of the C/KC-135 aircraft, of which 548 stratotankers and 46 special-purpose variants are on active duty. The average age of the aircraft in the fleet is 39 years. The stratotankers are equipped with a flying boom for fuel transfer and a deck above the fuselage-mounted tanks for passengers and cargo. Eight Air Force major commands, the National Aeronautics and Space Administration, and three foreign militaries operate C/KC-135 aircraft. The Air Force plans to operate the stratotanker fleet until 2040 and estimates that the total life-cycle cost to continue the program until then would be about \$76 billion.

Comanche. The Comanche, an Army Acquisition Category ID program, is the first Army helicopter specifically developed to provide the Army with an improved armed-reconnaissance capability. It will expand the capability of the Army to conduct armed-reconnaissance operations in all battlefield environments. The Comanche will replace three helicopters (AH-1, OH-58, and OH-6) that currently perform the armed-reconnaissance mission. The Army spent \$3.6 billion in research, development, test, and evaluation funds through FY 1997 and plans to spend an additional \$4.3 billion through FY 2009. The Army plans to begin fielding the Comanche during 2006.

F-15 Aircraft. The F-15 aircraft (the F-15), an Air Force Acquisition Category II program, consists of Eagle and Strike Eagle variants. The F-15 Eagle (F-15 models A through D) is an all-weather, tactical fighter designed to gain and maintain air superiority in aerial combat. The F-15 Strike Eagle, F-15 model E, is a dual-role fighter designed for air superiority and air-to-ground attack missions. The Air Force acquired the F-15 starting in March 1973 and has 409 F-15 Eagles and 201 F-15 Strike Eagles in active squadrons and 168 F-15 Eagles that are trainers, inactive, or in storage. The F-15 System Program Office plans to acquire 17 additional F-15 Strike Eagles through

²Examples of the Acquisition Category II and III modification programs include installing new engines on various models of the aircraft, major avionics modifications, satellite communications upgrade, and navigation and safety upgrades.

³The variants of the C/KC-135 include reconnaissance, electronic warfare, transport, and testbed aircraft.

FY 2000 and estimates life-cycle costs for the F-15 aircraft in active squadrons to total about \$53.3 billion through FY 2024. The Air National Guard also has 118 F-15 Eagles.

Grizzly. The Grizzly, an Acquisition Category II program, is an Army vehicle designed with a vehicle-width mine-clearing blade, a power-driven arm, and a commander's control station integrated on an M1 Abrams tank chassis. When fielded, a two-person crew will operate the Grizzly. The Army designed the Grizzly to clear lanes in natural obstacles, such as streams, dry gaps, and fallen trees, and in man-made obstacles, such as wire, craters, and mine fields, so that an Army maneuver force can safely advance. The Grizzly entered the engineering and manufacturing development acquisition phase in December 1996. The Grizzly Program Office had planned to hold the low-rate initial production milestone review in the second quarter of FY 2000 and to acquire a total of 366 Grizzly vehicles from FYs 2000 through 2013 at estimated life-cycle costs of \$4.6 billion for the program. However, during the FY 2000 budget review process, the Army eliminated funding for the Grizzly Program and considers the Program to be an unfunded requirement.

***Minuteman III* Guidance Replacement Program.** The *Minuteman III* is expected to be the United States' only fielded land-based intercontinental ballistic missile weapon system after 2003, when the *Minuteman II* and Peacekeeper missiles are retired as a result of arms control initiatives. The *Minuteman III* Guidance Replacement Program (the Program), an Air Force Acquisition Category IC program, is part of a DoD initiative to extend the life of the *Minuteman III* weapon system through 2020. The Program replaces the existing guidance set and increases guidance system reliability. The Program entered the engineering and manufacturing development phase of the acquisition process in August 1993. The Air Force funded the Program for \$1.9 billion through FY 2003.

***Minuteman III* Propulsion Replacement Program.** The *Minuteman III* is a ballistic missile weapon system of intercontinental range. The purpose of the Propulsion Replacement Program (the Program), an Air Force Acquisition Category IC program, is to extend the service life of the *Minuteman III* weapon system by remanufacturing and replacing the three solid rocket stages of its propulsion system before obsolescence occurs. The Air Force initiated the Program in response to national guidance for strategic deterrence and defense in the DoD Planning Guidance for maintaining a strategic nuclear force. The Program also responds to guidance in the 1992 National Military Strategy to continue to maintain a TRIAD to deter the threat of nuclear aggression. The *Minuteman III* weapon system will eventually become the only intercontinental ballistic missile component of the strategic TRIAD. The Intercontinental Ballistic Missile System Program Office estimates that program research and development will cost about \$331 million and that procurement will cost about \$1.8 billion.

***Nimitz*-Class Nuclear Aircraft Carrier.** The *Nimitz*-Class Nuclear Aircraft Carrier (the *Nimitz* Class), a Navy Acquisition Category IC program, is designed to support and operate aircraft to engage in attacks on targets afloat and ashore that threaten the Navy's use of the sea and to engage in sustained

operations in support of other forces. Construction of the *Nimitz*-Class nuclear aircraft carriers began in October 1967. The *Nimitz*-Class consists of 10 carriers, of which 8 are operational. The two remaining aircraft carriers, CVN-76 and CVN-77, are scheduled for delivery in December of 2002 and 2008, respectively. The December 31, 1998, Selected Acquisition Report, estimates the cost for the CVN-76 and the CVN-77 to be \$5.4 billion and \$5.9 billion, respectively.

T-45 Undergraduate Jet Pilot Training System. The T-45 Undergraduate Jet Pilot Training System (the T-45TS), an Acquisition Category IC program, is a Navy program designed to provide the necessary tools to train aviators for the Navy and Marine Corps. The T-45TS consists of T-45A/C aircraft with supporting ground equipment, contractor maintenance, and a pilot-training integration system that incorporates classroom academics, sophisticated flight simulators, and a training support center. The T-45TS supports a pilot training rate of 361 pilots per year. In FY 1995, the T-45TS began full-rate production. The Program Office plans to acquire a total of 234 aircraft by FY 2005 and estimated life-cycle costs for the T-45TS Program to total about \$15.4 billion.

UH-60 Black Hawk Helicopter. The UH-60 Black Hawk Helicopter (the Black Hawk), an Acquisition Category IC Program, is a utility, tactical, and transport helicopter that performs many missions in the Army. The Black Hawk is the primary helicopter for air assault, general support, and aeromedical evacuation units; and fulfills command and control, electronic warfare, and special operations roles. In 1978, the Black Hawk entered the production and fielding phase of the acquisition cycle. From 1978 through 1989, the Army procured UH-60A Black Hawk helicopters. In October 1989, the Army upgraded the power train system that resulted in a model designation change from UH-60A to UH-60L. By FY 2005, the Army plans to acquire 1,626 Black Hawk helicopters at an estimated total program cost of \$10.5 billion. The Army has deployed over 1,300 Black Hawk helicopters.

Appendix E. Summary of System Audit Reports Addressing Hazardous Material Management

From July 1997 through March 2000, the Inspector General, DoD, issued the following nine audit reports involving Defense systems with issues related to hazardous material management.

Audit Report No. D-2000-092, "Acquisition of the *Minuteman III* Propulsion Replacement Program," March 1, 2000. The report states that, overall, the Intercontinental Ballistic Missile System Program Office successfully developed and readied the *Minuteman III* Propulsion Replacement Program (the Program) for low-rate initial production within established cost, schedule, and performance baselines. However, the report identified two areas in hazardous material management that warranted additional management attention.

- The System Program Office did not ensure that analyses of the potential environmental consequences of developing and deploying the Program were performed and approved as required. This condition occurred because the System Program Office did not consider that the increase in program activity was significant and because it was not familiar with Air Force guidance that recommended against granting categorical exclusions for acquisition programs and DoD guidance that required the milestone decision authority to approve environmental analyses documentation. As a result, the System Program Office may not be able to inform the Air Force Acquisition Executive of the environmental effects of the program at the full-rate production decision that is scheduled for September 2000.
- The System Program Office did not complete its PESHE because the System Program Office staff did not recognize that DoD Regulation 5000.2-R applied to ongoing as well as new acquisition programs. Until the PESHE is completed and implemented, the System Program Office cannot be assured that the Program's environmental, safety, and health issues, and associated life-cycle cost impacts, will be incorporated in the day-to-day decisionmaking process of the Program.

In response to the report recommendations, the Air Force stated that the System Program Office will obtain the required environmental impact analyses from Hill Air Force Base, Utah, and Vandenberg Air Force Base, California, to support the program full-rate production decision and that the System Program Office plans to sign a coordinated PESHE.

Audit Report No. 00-022, "Hazardous Material Management for the *Nimitz*-Class Nuclear Aircraft Carrier Program," October 27, 1999. The

report states that the Aircraft Carrier Program Office approved and funded several environmental improvements that Naval Sea Systems Command initiated to reduce and eliminate hazardous material on the *Nimitz*-Class Nuclear Aircraft Carriers (the *Nimitz* Class). Also, the Program Office supported environmental pollution reduction efforts and carrier pollution prevention programs initiated at contractor and support organizations. However, the following areas warranted management attention.

- The Aircraft Carrier Program Office did not develop a total life-cycle cost estimate to establish its total ownership cost objective and threshold to include environmental costs for demilitarization, disposal, and associated cleanup of the *Nimitz*-Class carriers at the end of their useful life and for applicable ship alterations and overhauls. The Program Office did not develop a total life-cycle estimate because:
 - the Program Manager maintains that the requirement did not apply because the program started full-rate production before the DoD 5000 series of directives and regulations existed; and
 - the Program Office intended to develop the total life-cycle cost estimate for the *Nimitz*-Class Program concurrently with Navy efforts to revise the total life-cycle cost estimate for the Future Carrier Program⁴ and Newport News Shipbuilding efforts to develop a cost estimating model.

Without a total life-cycle cost estimate, the Program Office can not accurately baseline the *Nimitz*-Class program costs to establish a total ownership cost objective and threshold as part of the Navy's long-term cost reduction initiative.⁵ Further, the Program Office would not be able to accurately report the liability for demilitarization, disposal, and environmental cleanup costs for the *Nimitz* Class in the Navy's financial statements.

- The Aircraft Carrier Program Office had not developed a PESHE that included:
 - a strategy for meeting environmental, safety, and health requirements; identified demilitarization and disposal requirements;
 - program environmental responsibilities; and

⁴The Future Carrier Program is an Acquisition Category ID program, currently in the Concept Exploration phase. Milestone I, Approval to Begin a New Acquisition Program, decision is scheduled for May 31, 2000.

⁵Reduction of total ownership cost is an initiative of the Defense Systems Affordability Council.

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- a methodology to track progress throughout the acquisition life-cycle of the *Nimitz*-Class to include ship alterations and overhauls.

The Program Office did not develop a PESHE because it maintains that the DoD 5000 series of directives and regulations did not apply as the program started full-rate production before the DoD 5000 series existed. Without the PESHE, the Program Office cannot ensure that it is aware of the impact of environmental, safety, and health issues on mission and cost and may also be forgoing opportunities to further reduce environmental life-cycle costs over the life span of the *Nimitz* Class.

In response to the report recommendations, the Navy stated that it developed a total life-cycle cost estimate for the *Nimitz*-Class carriers and that the Program Manager for Aircraft Carriers will develop a *Nimitz*-Class environmental management plan.

Audit Report No. 00-012, "Hazardous Material Management for the F-15 Aircraft Program," October 15, 1999. The report states that, overall, the F-15 System Program Office planned and provided for the reduction and elimination of hazardous material in the F-15 Program. However, the following two areas warranted management attention.

- The F-15 System Program Office did not include environmental costs for demilitarization, disposal, and associated cleanup for F-15 aircraft⁶ at the end of their useful life in the F-15 life-cycle cost estimate. The System Program Office excluded those environmental costs because its analysts did not include a cost element in their cost model to account for demilitarization and disposal of the aircraft and associated environmental cleanup. As a result, the System Program Office understated the total life-cycle costs for the F-15 Program and would not be able to accurately report the liability for demilitarization, disposal, and environmental cleanup costs for the F-15 aircraft in Air Force financial statements.
- The F-15 System Program Office did not include program environmental responsibilities and a methodology to track and document the completion of its environmental strategy throughout the system acquisition life-cycle in its PESHE. The F-15 PESHE was incomplete because the System Program Office did not:
 - review and approve the PESHE after the Environmental Manager drafted the document; and
 - update the PESHE throughout the F-15 life-cycle to incorporate upgrades to the system.

⁶The F-15 System Program Office does not include any costs for the Air National Guard F-15 aircraft in its life-cycle cost estimate.

Without a PESHE that includes program environmental responsibilities and a methodology to track and document the completion of the environmental strategy, the System Program Office cannot ensure that it is aware of the impact of environmental, safety, and health issues on mission and cost and may also be forgoing opportunities to further reduce environmental life-cycle costs over the life span of the F-15 Program.

In response to the report recommendations, the Air Force stated that the F-15 System Program Office will include a cost element in the F-15 life-cycle cost estimate to account for demilitarization, disposal, and environmental cleanup and that the System Program Office will update its PESHE to include program environmental, safety, and health responsibilities and a methodology to track and document the completion of environmental, safety, and health strategy throughout the life cycle of the F-15 Program.

Audit Report No. 99-242, "Hazardous Material Management for the Black Hawk Helicopter Program," August 23, 1999. The report states that, overall, the Utility Helicopters Project Office planned and provided for the reduction and elimination of hazardous materials in the UH-60 Black Hawk Helicopter (the Black Hawk) Program. However, the following areas warranted management attention.

- The Utility Helicopters Project Office for the Black Hawk did not include environmental costs for demilitarization, disposal, and associated cleanup of the Black Hawk in the system life-cycle cost estimate. The Project Office excluded those environmental costs because it believed those environmental costs were not significant enough to estimate because the Army anticipated donating and selling the helicopters instead of disposing of them. However, the Project Office did not have a plan for the donation and sale of the helicopters. As a result, the Project Office understated the total life-cycle costs for the Black Hawk and would not be able to accurately report the liability for demilitarization, disposal, and environmental cleanup costs for the Black Hawk in the Army's financial statements.
- The Utility Helicopters Project Office for the Black Hawk did not include program environmental responsibilities and a methodology to track and document the completion of the environmental strategy throughout the acquisition life-cycle in its PESHE. The Project Office did not include environmental responsibilities and a tracking and documenting methodology in its PESHE because it believed that its response to an environmental compliance review in FY 1998 of the Black Hawk complied with PESHE requirements. Without a PESHE that includes program environmental responsibilities and a methodology to track and document the completion of the environmental strategy, the Project Office cannot ensure that it is aware of the impact of environmental, safety, and health issues on mission and cost and may also be forgoing opportunities to further reduce environmental life-cycle costs over the life span of the Black Hawk.

In response to the report recommendations, the Army stated that, if the Army funds the Black Hawk Modernization Program, the Black Hawk Program will comply with the recommendations as long as the associated milestone review requires an environmental cost estimate; a plan for demilitarization, disposal, and associated cleanup of the Program; and updates to the PESHE.

Audit Report No. 99-221, "Hazardous Material Management for the T-45 Undergraduate Jet Pilot Training System," July 21, 1999. The report states that, overall, the T-45TS Program Office planned and provided for the reduction and elimination of hazardous material in the T-45TS. However, the following two areas warrant management attention.

- NAS Kingsville, a maintenance facility for the T-45TS aircraft, did not establish a CHRIMP with HSMS software that controls, tracks, and reduces the variety and use of hazardous material. Also, NAS Kingsville did not have a hazardous material minimization center (the Center) that provides centralized storage, distribution, and reutilization of hazardous material and the disposal of hazardous material waste. Further, the T-45TS Program Office contracted for a hazardous material module to its GOLD System that will measure hazardous material use against a given work item; however, the module does not provide a life-cycle approach for managing hazardous material as does HSMS. NAS Kingsville did not establish a CHRIMP with HSMS software and a fully operational Center because supply personnel believed that their existing implementation of CHRIMP met Navy requirements. The Program Office advised that it contracted for the GOLD System's hazardous material module because it considered the module to be a streamlining effort to make material tracking an integral part of the T-45TS maintenance process. As a result, by not establishing a CHRIMP with HSMS software and a fully operational Center, NAS Kingsville did not achieve life-cycle hazardous material control, management, and pollution prevention for the T-45TS in conformance with Navy policy. Further, the T-45TS Program Office efforts to establish the GOLD System's hazardous material module impeded Navy efforts to standardize hazardous substance management.
- The T-45TS Program Office did not include in the program's life-cycle cost estimate and demilitarization and disposal plan the cost for demilitarization, disposal, and environmental cleanup of the T-45TS at the end of its useful life. The Program Office excluded demilitarization, disposal, and cleanup costs because of the following:
 - historical cost data for demilitarization and disposal of weapon systems were not readily available and
 - the Navy did not develop the technical expertise or models to estimate life-cycle costs for demilitarization, disposal, and environmental cleanup.

As a result of the incomplete total life-cycle cost estimate, the Program Office could not accurately report in Navy financial statements the liability for demilitarization, disposal, and environmental cleanup costs for the T-45TS.

In response to report recommendations concerning hazardous material reutilization and inventory management, the Navy met the intent of those recommendations by stating that:

- it has budgeted funds for FY 2000 to support any equipment upgrades necessary to facilitate the integration of HSMS at NAS Kingsville;
- NAS Kingsville has established a CHRIMP with HSMS software and a fully operational centralized hazardous material minimization center; and
- an interface problem with the GOLD System's hazardous material module and HSMS software would not occur as long as the maintenance contractor, who uses the GOLD System to support the maintenance and material management efforts of the T-45TS aircraft, obtained its hazardous material directly from the Hazardous Material Minimization Center at NAS Kingsville.

The report also made a recommendation concerning environmental life-cycle costs. In response, the Navy stated that the Naval Air Systems Command updated the T-45 total ownership cost estimate to include demilitarization, disposal, and environmental costs and will include those costs in all future estimates.

Audit Report No. 99-177, "Hazardous Material Management for the C/KC-135 Stratotanker Aircraft," June 4, 1999. The report states that, overall, the C/KC-135 Program Office planned and provided for the reduction of hazardous material in the C/KC-135 Stratotanker Aircraft (the C/KC-135). However, the following two areas warranted management attention to ensure that the Program Office identifies potential demilitarization and disposal liabilities and evaluates the impact of environmental, safety, and health issues on mission and cost.

- The C/KC-135 Program Office did not include the cost of demilitarization and disposal of the C/KC-135 at the end of its useful life in the program's life-cycle cost estimate. The Program Office did not include demilitarization and disposal costs because the Air Force cost analysts did not include a cost element in their cost model to account for demilitarization and disposal of the aircraft and associated infrastructure. As a result, the Program Office cannot accurately report in Air Force financial statements the liability for demilitarization, disposal, and cleanup costs for the C/KC-135 over the next 41 years.

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- The C/KC-135 Program Office did not develop a PESHE that included an environmental strategy, program environmental responsibilities, and a methodology to track and document the completion of the environmental strategy throughout the acquisition life-cycle. The Program Office did not develop a PESHE because the Program Office relied on the C/KC-135 Weapon System Pollution Prevention Master Plan (the Master Plan) to address the environmental requirements of the C/KC-135; however, the Master Plan did not include those requirements. Without the evaluation, the Program Office cannot ensure that it is aware of the impact of environmental, safety, and health issues on mission and cost and may also be forgoing opportunities to further reduce environmental life-cycle costs over the extended life span of the C/KC-135.

In response to the report recommendations, the Air Force stated that the C/KC-135 Program Office will include demilitarization and disposal cost elements in the C/KC-135 Economic Service Life Study and that the Program Office will include a PESHE in its C/KC-135 Pollution Prevention Master Plan.

Audit Report No. 99-160, "Hazardous Material Management on the Grizzly Program," May 17, 1999. The report states that, overall, the Grizzly Program Office planned and provided for the reduction and elimination of hazardous material in the design of the Grizzly consistent with program cost, schedule, and performance goals. However, the following two areas warranted management attention.⁷

- The Grizzly Program Office did not include in the program's life-cycle cost estimate the cost of demilitarization and disposal of the Grizzly at the end of its useful life. Further, the Program Office did not verify that all environmental costs related to the acquisition, handling, and use of hazardous materials in the production, operation, and maintenance of the Grizzly were in the life-cycle cost estimate. The Program Office excluded demilitarization and disposal costs from the program's life-cycle cost estimate because it did not:
 - have historical cost data and the technical expertise to estimate those costs or
 - request technical assistance from other Army organizations.

The Program Office did not verify the costs related to the acquisition, handling, and use of hazardous materials because other Army organizations and the contractor did not specifically identify the hazardous material costs in their life-cycle cost estimate for the Grizzly. As a result, the Program Office understated the total life-cycle costs for the Grizzly and would not be able to accurately report

⁷During the FY 2000 budget review process, the Army eliminated funding for the Grizzly Program and considers the Program to be an unfunded requirement.

the liability for cleanup costs of hazardous waste related to the disposal of the Grizzly vehicle in Army financial statements when the Army fields the Grizzly.

- The Grizzly Program Office did not develop a PESHE that included an environmental strategy, program environmental responsibilities, and a methodology for tracking and documenting the completion of the environmental strategy throughout the acquisition life cycle. The Program Office did not develop a PESHE before the engineering and manufacturing decision in December 1996 because the Program Office needed technical assistance to develop the PESHE and the Program Office experienced administrative delays initiating the PESHE. Without performing the required PESHE, the Program Office would not have assurance that it is aware of mission and cost impacts arising from environmental, safety, and health issues.

In response to the report recommendations, the Army stated that the Grizzly Program Office would update the life-cycle cost estimate and would complete the PESHE.

Audit Report No. 98-185, "Financial Management of the RAH-66 Comanche Helicopter Program," August 6, 1998. Concerning hazardous material management, the report states that the Comanche Program Office underestimated the life-cycle cost for the Comanche helicopter. The life-cycle cost estimate did not include the cost of acquiring, handling, using, and disposing of hazardous materials and the disposal costs for the Comanche helicopters at the end of their useful lives. In preparing the life-cycle cost estimate, the Comanche Program Office did not include the cost of acquiring, handling, using, and disposing of hazardous materials because:

- officials of the Comanche Program Office believed that the Comanche helicopter production design would reduce or eliminate many of the hazardous materials currently being used in the design, and
- the Army did not provide a model for preparing the life-cycle cost for environmental issues associated with hazardous material.

As a result, the life-cycle cost analysis for the Comanche helicopter weapon system did not provide management with accurate information to determine whether the Comanche was affordable in the context of long-range investment plans.

The report did not make a recommendation because the Comanche Program Office agreed to incorporate the disposal cost of hazardous material and disposal cost of the Comanche helicopter into the Comanche life-cycle cost estimate before the next milestone review.

Audit Report No. 97-199, "The Minuteman III Guidance Replacement Program," July 29, 1997. Concerning hazardous material management, the report states that the Intercontinental Ballistic Missile System Program Office

did not plan to develop a PESHE before the full-rate production decision to the extent required by the new DoD Regulation 5000.2-R. The System Program Office did not plan to meet the revised acquisition policy requirements for the PESHE because the *Minuteman III* Guidance Replacement Program (the Program) staff had developed an environmental, safety, and health evaluation process by following the acquisition policy in force in 1993 and because the Program was granted an exclusion from the requirement for an environmental impact analysis. In March 1996, DoD Regulation 5000.2-R changed acquisition policy to require that all programs conduct environmental, safety, and health analyses in the system engineering process. Without performing the required PESHE, the System Program Office will not have assurance that it is aware of mission and cost impacts arising from environmental, safety, and health issues.

In response to the report recommendation, the Air Force stated that it would perform a PESHE before the Guidance Replacement Program full-rate production milestone review.

Appendix F. Summary of Army Audit Agency Report on Eliminating Hazardous Material in Weapon Systems

Audit Report No. AA 98-153, "Eliminating Hazardous Material in Weapon Systems," April 15, 1998. The audit reviewed the Army's pollution prevention initiatives and actions taken to reduce or eliminate hazardous material in weapon systems, and focused on the Army's efforts at the Department of the Army and the Army research and development organizations and on acquisition programs for 11 weapon systems. The report states that, generally, the Army appropriately integrated pollution prevention initiatives into its research and development efforts, and most ongoing acquisition programs. However, program managers did not consider environmental costs when they developed system life-cycle costs. Program managers for 9 of 11 weapon systems had appropriately integrated pollution prevention initiatives. They established material management teams that focused on eliminating or reducing hazardous material, prepared the documentation required by law, and included the appropriate pollution prevention clauses in contracts. However, they generally did not consider environmental costs in system life-cycle cost estimates because adequate guidance was not in place. During the audit, the Army issued guidance on environmental costing for systems acquisition.

Further, the report states that the Army efforts eliminated or reduced, to some extent, the use of hazardous material in weapon systems. For example, the Army Armament, Research, Development, and Engineering Center developed the Green Bullet Program to minimize the hazardous and toxic material used in production of small-caliber ammunition. Also during FY 1996, the Army began to review its military specifications, standards, and technical manuals to identify hazardous material, find alternative materials or processes, and revise the documents as required by Executive Order 12856 (Federal Compliance With Right-to-Know Laws and Pollution Prevention Requirements). However, despite implementing pollution prevention initiatives, materiel developers documented minimal progress in reducing or eliminating hazardous material in weapon systems. Most of the progress occurred because of efforts coordinated at the Department of the Army level that focused on selected hazardous material, such as ozone-depleting chemicals.

The report recommended that the Army assign an Army-level activity the responsibility for managing pollution prevention efforts in the systems acquisition process and require program and project managers to periodically report the progress and accomplishments of their pollution prevention efforts. The report also recommended reporting of pollution prevention progress and accomplishments.

In response to the recommendations, the Army agreed to assess progress in eliminating hazardous materials during program management reviews and milestone decision reviews.

Appendix G. Report Distribution

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